Department of Commerce · National Oceanic & Atmospheric Administration · National Weather Service

NATIONAL WEATHER SERVICE INSTRUCTION 10-1004
MARCH 17, 2005

Operations and Services
Climate Services, NWSPD 10-10

CLIMATE RECORDS

NOTICE: This publication is available at: http://www.nws.noaa.gov/directives/

OPR: OS4 (R. Leffler) **Certified by:** OS4 (R. Livezey)
Type of Issuance: Routine

SUMMARY OF REVISIONS: This instruction supersedes National Weather Service Instruction 10-1004, dated September 30, 2002. The directive has been renamed from "Climate Means" to "Climate Records." The previous directive covered only local long term normals, means, and extremes. Information on surface observational data was also added to the directive, resulting in the title change to "Climate Records."

This updated instruction also includes surface national climate extremes.

The following three Weather Forecast Office (WFO) surface climatological data reports were transferred from NWS Instruction 10-501 (WFO Statements, Summaries, Tables Products Specification) to this instruction.

- Climatological Report (Daily) (CLI)
- Climatological Report (Longer Term) (CLM)
- Preliminary Local Climatological Data Report (F-6)

Three new appendices were added:

A. Ten Climate Monitoring Principles
B. Request For National Climate Extremes Committee (NCEC) Activation For Potential Events
C. Local Climatological Data Stations

(signed) March 3, 2005
Dennis H. McCarthy Date
Acting Director, Office of Climate,
Water, and Weather Services

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1. Introduction. This instruction describes station climatological data from observations and the principles to promote the integrity of the climatological data record. The instruction also describes station long term normals, means, and extremes as well as national extremes. This instruction also describes station climatological reports. The National Environmental Satellite Data and Information Service's National Climatic Data Center (NCDC) determines station long term normals, means, and extremes for observing station data. The Climate Prediction Center (CPC) provides forecast means and outlook classes as reference in their climate outlooks.

2. Surface Station Observation Data. Observational and daily climate data include the values, totals, or averages of the following elements for an instant, minute(s), hour, day, month, season, year, and/or other time period, as appropriate. In 2002, the NWS Assistant Administrator began managing its weather/climate monitoring systems through compliance with the "ten principles of climate monitoring". Appendix A provides the ten climate monitoring principles of data stewardship. To protect and enhance the integrity of the climate records, Weather Forecast Offices (WFO) should apply these principles within their capability for surface observing stations in their area of responsibility. NWS Instruction 10-1305 (Observational Quality Control – General) provides additional information and procedures for WFOs to protect and enhance the integrity of the climate records.

high temperature	heating degree days	snowfall
low temperature	cooling degree days	snow depth
average temperature	precipitation	minutes of sunshine

average wind speed in miles per hour
fastest average 2 minute wind speed (in miles per hour)
average direction of the wind speed, using 360 degrees of a compass and/or 8 points of compass.
highest wind gust for the day (in miles per hour)
direction of the day's peak wind gust (in miles per hour).
weather type
cloud cover
visibility

3. Surface Station Long Term Normals, Means, and Extremes. NCDC provides these statistics for temperature, precipitation, snowfall, and heating and cooling degree days for use with NWS Automated Surface Observing System (ASOS) sites and NWS cooperative observing stations.

3.1 Definitions. The definitions used for these statistics are consistent with World Meteorological Organization (WMO) terminology.

Period of Record: The full length of a station's records from beginning of observations to present.

Record Mean: The mean for the station's period of record, without regard to changes in a station's location.

Adjusted Record Mean: The mean for the station's period of record, after adjusting the data for changes in station location.

Period Mean. A period mean is a mean computed for any period of at least 10 years starting on January 1 of a year ending with the digit 1. One such period is January 1, 1991 through December 31, 2000.

Normal. A normal is a period mean computed by NCDC for an NWS observing station from a period comprising three consecutive 10-year periods (for example, 1971-2000). For cases of sensor instrumentation change and/or relocation, NCDC will make appropriate adjustments to the observational record for the observing station. See section 3.3.3 for details.

3.2. Official Source of Normals. NCDC issues the following publications as part of the Climatography of the United States (CLIM) series as follows:

CLIM No. 81: Monthly Normals of Temperature, Precipitation, and Heating and Cooling Degree Days, 1971-2000.

CLIM No. 84: Daily Normals of Temperature, Precipitation, and Heating and Cooling Degree Days, 1971-2000.

3.3. Effective Dates of Normals. The NWS and NCDC will set the effective date for temperature, precipitation, and cooling degree day normals as January 1 following publication of the CLIM. NWS and NCDC will set the effective date for heating degree day and snowfall normals as July 1 of that same year. For the 1971-2000 normals, the effective dates were January 1, 2002 and July 1, 2002, respectively.

3.4. Calculation of Normals.

3.4.1 Monthly Normals. NCDC calculates the monthly normals using observed daily data (according to section 2) except for degree days at NWS cooperative observation stations, as noted below. Monthly degree day normals at NWS ASOS stations are derived from observed daily data (the same as other elements).

Notes on deriving monthly degree day normals at NWS cooperative observation stations:

- NCDC computes monthly degree day normals from estimates of monthly degree day values using a modified version of the Rational Conversion Formulae developed by H.C.S. Thom.

- NCDC uses this modified Thom technique to derive estimated monthly degree day values with a spline fit of the monthly mean temperature and standard

deviations to ameliorate the month-to-month step function inherent with only a single monthly input.

3.4.2. Daily Normals. NCDC derives daily normals by interpolating from the respective monthly normals using a cubic spline function. Therefore, the daily normals do not have climatological or meteorological significance. For example, a daily precipitation normal of 0.12 inches on May 1 does not imply that the most likely precipitation amount on May 1 is 0.12 inches. WFOs use these daily normals for the calculation of daily, weekly, monthly, seasonal, yearly, month-to-date, season-to-date, and year-to-date departures from normal.

Note on daily degree day normals: In months with few heating and cooling degree days, NCDC uses an asterisk (*) to indicate values of less than 1 but greater than 0 for a given day. NCDC uses this convention to smooth the daily distribution of daily degree days in such months and to ensure compatibility of daily mean temperature and heating and cooling degree days.

3.4.3. Effect on Normals from Changes in Observing Conditions. If temperature sensors or precipitation gauges are relocated and/or replaced by new equipment, the NWS will collect comparative data to be used as the basis for revising the normals. See Instruction 10-1302 (Instrument Requirements and Standards for the NWS Surface Observing Program [Land]) for further details. Revised normals become official as soon as they are distributed to the WFO for that observing site.

Note: NCDC usually adjusts the observational record for the 1971-2000 normals period to be representative of the observing conditions (instrumentation and/or location) as of the last day of the normals period (e.g. December 31, 2000). If changes in observing conditions occur, records adjustment to the last day of the normals period requires the changes to be detectable and correctable using established methods of change point detection. For instance, changes in observation conditions that occur near the end of the normals period may not lead to a detectable change or discontinuity in the observational record. In this case, NCDC would adjust the record to the observing conditions prior to that change. For example, a change in observing practices on October 15, 2000 would probably not yield a detectable discontinuity. Thus, the adjustment would be made to conform with practices on October 14, 2000 instead of December 31, 2000.

3.4.4 Normals and Observations for February 29. WFOs will handle normals and observations related to February 29 in leap years in the following manner:

- February 29 (Daily) Normals: For February 29, WFOs will use the February 28 values for temperature, precipitation, snowfall, and heating/ cooling degree days.

- February Monthly Normals: No change will be made in leap years for normal temperatures, precipitation or snowfall. However, for heating and cooling degree days, WFOs will increase the February normals by the February 29 values.

- Seasonal Normals: After February 29, WFOs will not increase normal seasonal heating and cooling degree day totals, precipitation, or snowfall by the February 29 values.

- Annual Normals: There will be no change in annual temperature, precipitation, or snowfall values by the February 29 values.

- Seasonal and Annual Observed Totals: WFOs will increase the seasonal and annual precipitation and snowfall totals by the February 29 observed values. WFOs will increase seasonal heating and cooling degree days totals by the February 29 values.

Example for heating degree days (cooling degree days would be treated similarly):

For February Computations:

	NORMAL	OBSERVED	DEPARTURE FROM NORMAL
Season through January	2850	2850	0
February 1-28	+800	+700	
February 29	+ 30	+ 20	
Season through February	3680	3570	-110

For March Computations:

Remove Feb 29 Normal	- 30		
Updated through February	3650	3570	- 80
March 1-31	+600	+530	
Season through March	4250	4100	-150

Consider the following example for precipitation (snowfall would be treated similarly):

For February Computations:

	NORMAL	OBSERVED	DEPARTURE FROM NORMAL
January	3.00	3.00	0
February 1-28	2.80	2.75	-0.05
February 29	0.10	0.06	-0.04
February 1-29	2.80 (still)	2.81	+0.01
Year through February	5.80	5.81	+0.01

4. Surface Climatological Data Products. These reports contain information in accordance with sections 2 and 3. Weather Forecast Offices (WFO) will issue the following products for ASOS sites of major interest (including all official Local Climatological Data (LCD) sites (see Appendix C). Data values on these products are preliminary since they are issued before official certification by NCDC. Sunrise, sunset, and sunshine in these reports are not official since the U.S. Naval Observatory has official astronomical records. See WFO web page disclaimers in

NWS Instruction 10-1003. WFOs should compose these products with the Advanced Interactive Weather Processing System (AWIPS) CLIMATE program or a text editor if the program is not available. WFOs should report problems with the AWIPS CLIMAT program to their regional climate service program manager. If the problem can not be resolved at the regional level, the regional manager will forward the WFO's report to the NWS Climate Services Division.

4.1 Climatological Report (Daily) (Product Category CLI).

4.1.1 Mission Connection . The CLI provides miscellaneous climatological data on a daily basis.

4.1.2 Issuance Guidelines .

a. Issuance Criteria . CLIs for LCD sites should be sent as separate products (i.e., unique AWIPS ID/WMO ID combination). CLIs for non-LCD sites may be sent as separate products or grouped together within an LCD product separated by "&&."

b. Issuance Time . The CLI will be issued at least twice daily. The first mandatory issuance will be between 12:30 a.m. and 5:00 a.m. local time to capture the previous calendar day's (midnight-to-midnight Local Standard Time [LST]) data. The second mandatory issuance will be in the late afternoon/early evening (typically between 3:00 p.m. and 5:30 p.m. local time), before local newscast times, to capture data for the current day. Other optional issuances may be made to meet local customer requirements (e.g., a late morning report to capture the current day morning low temperature, an early evening report to capture the final high temperature for the day, etc.)

c. Valid Time . The CLI is valid from the time of release until the next issuance.

d. Product Expiration Time . The CLI does not have a product expiration time.

4.1.3 Technical Description .

a. MND Product Type Line . The CLI MND is "CLIMATE REPORT."

b. Content . The CLI contains the standardized data shown below. All elements shown in section "c" are required for both mandatory daily issuances, except as identified in Note 3 at the end of section "c," for all CLIs year-round. Elements to be included in the optional CLIs may be adapted to meet local needs. "MM" will be used to indicate missing data, as appropriate. WFOs will **not** make estimates for missing data. To ensure consistency with NCDC routines, one or more missing daily values will result in a "MM" for the monthly value. WFOs may append specialized data to the end of the standard fixed-fields to meet the needs of local customers.

c. Format . The CLI is a tabular product. However, supplemental narrative information may be included to meet local customer needs. When specialized or additional information is appended to the standard format, it will be separated from the standard fixed-fields by double ampersands (&&). Double dollar signs ($$) will be used to signify the end of the product.

Product Format	Description of Entry
CDaa4i cccc ddhhmm	(WMO Heading)
CLIxxx	(AWIPS ID)

```
CLIMATE REPORT
NATIONAL WEATHER SERVICE <WFO> <STATE>
<HMM> AM <LT> <DAY MMM DD YYYY>
.....................................

...THE <CITY1 NAME> CLIMATE SUMMARY FOR <MONTH DD YEAR>...

CLIMATE NORMAL PERIOD YYYY TO YYYY
CLIMATE RECORD PERIOD YYYY TO YYYY

WEATHER ITEM   OBSERVED  TIME   RECORD YEAR NORMAL DEPARTURE LAST
                VALUE    (LST)  VALUE       VALUE  FROM      YEAR
                                                   NORMAL
.....................................................................

TEMPERATURE (F)
 YESTERDAY
  MAXIMUM        000    0000 PM 000    YYYY 000    000       000
  MINIMUM        000    0000 AM 000    YYYY 000    000       000
  AVERAGE        000                       000    000       000

PRECIPITATION (IN)
 YESTERDAY        00.00          00.00 YYYY  00.00  00.00     00.00
 MONTH TO DATE    00.00                      00.00  00.00     00.00
 SINCE <SEASON>   00.00                      00.00  00.00     00.00
 SINCE JAN  1    000.00                      00.00  00.00     00.00

SNOWFALL (IN)
 YESTERDAY        00.0           00.0  YYYY  00.0   00.0      00.0
 MONTH TO DATE   000.0                      00.0  000.0     000.0
 SINCE <SEASON>  000.0                     000.0 0000.0    0000.0
 SINCE JUL  1   0000.0                     000.0 0000.0    0000.0
 SNOW DEPTH      000

DEGREE DAYS
 HEATING
  YESTERDAY      000                         00    000       000
  MONTH TO DATE 0000                       0000   0000      0000
  SINCE <SEASON>0000                       0000  00000      0000
  SINCE JUL  1 00000                      00000  00000     00000

 COOLING
  YESTERDAY       00                         00    000        00
  MONTH TO DATE 0000                        000   0000      0000
  SINCE <SEASON>0000                       0000   0000      0000
  SINCE JAN  1  0000                       0000   0000      0000

.....................................................................
```

```
WIND (MPH)
 HIGHEST WIND SPEED    000    HIGHEST WIND DIRECTION <DIR> (000)
 HIGHEST GUST SPEED    000    HIGHEST GUST DIRECTION <DIR> (000)
 AVERAGE WIND SPEED     00.0

SKY COVER
 POSSIBLE SUNSHINE 000 PERCENT
 AVERAGE SKY COVER 0.0

WEATHER CONDITIONS
 THE FOLLOWING WEATHER WAS RECORDED YESTERDAY.
 <W1>
 <W2>
 <W3>
 <ETC.>

RELATIVE HUMIDITY (PERCENT)
 HIGHEST 000   0000 PM
 LOWEST  000   0000 AM
 AVERAGE 000
.....................................................................

THE <CITY1 NAME> CLIMATE NORMALS FOR TODAY
                          NORMAL    RECORD    YEAR
 MAXIMUM TEMPERATURE (F)  000       000      YYYY
 MINIMUM TEMPERATURE (F)  000       000      YYYY
SUNRISE AND SUNSET
<MONTH DD YEAR>........SUNRISE  0000 AM <LT>  SUNSET  0000 PM <LT>(today)
<MONTH DD YEAR>........SUNRISE  0000 AM <LT>  SUNSET  0000 PM <LT>(tomorrow)

-  INDICATES NEGATIVE NUMBERS.
R  INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T  INDICATES TRACE AMOUNT.

&&    (Standard Format end indicator entered locally)
---------------------------------------------------------------------
(<any additional local specialized climate data>

$$
```

Note 1: Note: The “xxx” in this product is the three-letter data site identifier, or WFO site identifier for reports with multiple non-LCD data sites.

Note 2: <Season-to-date> may be locally set to alternate season/year-to-date.

Default <seasons> are defined as:

Winter - December, January, February
Spring - March, April, May
Summer - June, July, August
Fall - September, October, November

Note 3: WFOs may report only OBSERVED VALUEs for SNOWFALL. However, if a WFO elects to report ANY other snowfall field (i.e., RECORD VALUE, YEAR, NORMAL VALUE, DEPARTURE FROM NORMAL, or LAST YEAR), then all SNOWFALL fields will be reported.

4.1.4 Updates, Amendments, and Corrections . These will be done as needed.

4.1.5 Supporting Software . The AWIPS CLIMATE program uses the ASOS Daily Summary Message (DSM) to produce the CLI. The DSM is a coded message for the NWS National Centers for Environmental Prediction (NCEP), NCDC, and WFO use only. If some data entries are not available from the DSM, other sources, such as the METARs (Transmitted Aviation Weather Reports) or Supplemental Climatic Data (SCD) reports may be used to fill in gaps in the DSM. WFOs should correct erroneous data in the CLI, but manual quality control of the DSM is not required. WFOs, however, may transmit corrections to the DSM or submit corrected data to NCDC via Weather Service (WS) Form B-14, Notice of Correction to Records, as desired. The "PRIMARY DSM XMIT TIME" will be set to 00:15 a.m. LST for each ASOS site. Intermediate DSMs may be generated and transmitted at any time to meet local needs. The ASOS Users Guide provides detailed guidance regarding the DSM.

4.2. Climatological Report (Longer Term) CLM.

4.2.1 Mission Connection . The CLM provides miscellaneous climatological data for a weekly, monthly, seasonal, or yearly basis. The monthly report is the most common report.

4.2.2 Issuance Guidelines.

a. Issuance Criteria . CLMs for LCD sites should be issued as separate products (i.e., unique AWIPS ID/WMO ID combination). CLMs for non-LCD sites may be issued as separate products or grouped together within an LCD product.

b. Issuance Time . The CLM will be issued at least monthly, no later than the 5th day of the following month. A monthly product can be generated using the AWIPS CLIMATE program anytime AFTER 2:30 a.m. the first day of the following month.

c. Valid Time . CLMs are valid from the time of release until the next issuance.

d. Product Expiration Time . The CLM does not have a product expiration time.

4.2.3 Technical Description .

a. MND Product Type Line . The CLM MND is "CLIMATE REPORT."

b. Content. The CLM contains the standardized data shown that follows. These elements are **required** for all CLMs year-round. "MM" will be used to indicate missing data, as appropriate (i.e. one or more missing daily values result in "MM" for monthly value). WFOs will not make estimates for missing data. WFOs may append specialized data to the end of the standard fixed-fields to meet the needs of local customers.

c. Format . The CLM is a tabular product. However, supplemental narrative information may be included to meet local customer needs. When specialized or additional information is appended to the standard format, it will be separated from the standard fixed-fields by double ampersands (&&). Double dollar signs ($$) will be used to signify the end of the product.

Note: The "xxx" in this product is the three-letter data site identifier, or WFO site identifier for reports with multiple non-LCD data sites.

Product Format — Description of Entry

```
CXaa5i cccc ddhhmm                                              (WMO Heading)
CLMxxx                                                          (AWIPS ID)

CLIMATE REPORT
NATIONAL WEATHER SERVICE <WFO> <ST>
<HMM> AM <LT> <DAY MMM DD YYYY>

.................................

...THE <CITY_NAME> CLIMATE SUMMARY FOR THE MONTH OF <MONTH> <YEAR>...

CLIMATE NORMAL PERIOD YYYY TO YYYY
CLIMATE RECORD PERIOD YYYY TO YYYY

WEATHER     OBSERVED                NORMAL      DEPART      LAST YEAR'S
            VALUE       DATE(S)     VALUE       FROM        VALUE DATE(S)
                                                NORMAL
.....................................................................
TEMPERATURE (F)
RECORD
 HIGH             00    MM/DD/YYYY
 LOW              00    MM/DD/YYYY
HIGHEST           00    MM/DD       00          00          MM    MM
LOWEST            00    MM/DD       00          00          MM    MM
AVG. MAXIMUM      00.0              00.0        0.0         MM
AVG. MINIMUM      00.0              00.0        0.0         MM
MEAN              00.0              00.0        0.0         MM
DAYS MAX >= 90    00                0.0         0.0         MM
DAYS MAX <= 32    00                0.0         0.0         MM
DAYS MIN <= 32    00                0.0         0.0         MM
DAYS MIN <= 0     00                0.0         0.0         MM

PRECIPITATION (INCHES)
RECORD
 MAXIMUM          0.00  YYYY
 MINIMUM          0.00  YYYY
TOTALS            0.00              0.00        0.00        MM
DAILY AVG.        0.00              0.00        0.00        MM
DAYS >= .01       00                0.0         0.0         MM
DAYS >= .10       00                0.0         0.0         MM
DAYS >= .50       00                0.0         0.0         MM
DAYS >= 1.00      00                0.0         0.0         MM
GREATEST
 24 HR. TOTAL     0.00  MM/DD TO MM/DD                        MM
```

```
SNOWFALL (INCHES)
RECORDS
 TOTAL             0.0   YYYY
TOTALS             0.0                0.0          0.0          MM
SINCE 7/1          0.0                0.0          0.0          MM
SNOWDEPTH AVG.     0                  0            0            MM
DAYS >= 1.0        0                  0.0          0.0          MM
GREATEST
 SNOW DEPTH        0     MM                                      MM    MM
 24 HR TOTAL       0.0   MM/DD TO MM/DD                          MM

DEGREE_DAYS
HEATING TOTAL      000                000          00           MM
 SINCE 7/1         0000               MM           MM           MM
COOLING TOTAL      00                 00           00           MM
 SINCE 1/1         00                 MM           MM           MM

WIND (MPH)
AVERAGE WIND SPEED                    0.0
HIGHEST WIND SPEED/DIRECTION          00/000       DATE  MM/DD
HIGHEST GUST SPEED/DIRECTION          00/000       DATE  MM/DD

SKY COVER
POSSIBLE SUNSHINE (PERCENT)    00
AVERAGE SKY COVER              0.00
NUMBER OF DAYS FAIR            0
NUMBER OF DAYS PC              00
NUMBER OF DAYS CLOUDY          00

AVERAGE RH (PERCENT)           00

WEATHER CONDITIONS. NUMBER OF DAYS WITH
THUNDERSTORM             00    MIXED PRECIP             00
HEAVY RAIN               00    RAIN                     00
LIGHT RAIN               00    FREEZING RAIN            00
LT FREEZING RAIN         00    HAIL                     00
HEAVY SNOW               00    SNOW                     00
LIGHT SNOW               00    SLEET                    00
FOG                      00    FOG W/VIS <= 1/4 MILE    00
HAZE                     00

-  INDICATES NEGATIVE NUMBERS.
R  INDICATES RECORD WAS SET OR TIED.
MM INDICATES DATA IS MISSING.
T  INDICATES TRACE AMOUNT.

&&    (Standard Format end indicator entered locally)
-------------------------------------------------------------------
(<any additional local specialized climate data>

$$
```

4.2.4 Updates, Amendments, and Corrections . As needed, based upon customer needs.

4.2.5 Supporting Software. The AWIPS CLIMATE program usually uses the WFO's own database of monthly values (which were mainly derived from the ASOS DSMs) to produce the CLM. The WFOs, however, may optionally use ASOS Monthly Summary Message (MSM) to produce the CLM. The MSM is a coded message for NCEP, NCDC, and WFO use only. Manual quality control of the MSM is not required. WFOs should correct erroneous or missing data in the CLM. WFOs may transmit corrections to the MSM or submit corrected data to NCDC via WS Form B-14, Notice of Correction to Records, as desired. The "MSM XMIT TIME" will be set to 02:15 a.m LST for each ASOS site. The ASOS Users Guide provides detailed guidance regarding the MSM.

4.3 Preliminary Local Climatological Data Report (F-6).

4.3.1 Mission Connection . Preliminary Local Climatological Data (WS Form F-6), is for use by NCDC to develop the official climate record for the LCD sites. It is also used by the public.

4.3.2 Issuance Guidelines. WFOs will, at a minimum, post on the World Wide Web the F-6 data for the entire preceding calendar month no later than the 5th day of the following month. WFOs may post the F-6 data more frequently (i.e., month to date). WFOs will provide NCDC the name, e-mail address, and telephone number of a point of contact for questions relating to the F-6 data. The WFO F-6 web page (with links to all F-6 data) will include a disclaimer stating that the data is "preliminary" and a note stating that NCDC is the official source of climate data. The F-6 web page should be easily available through a minimum of web links.

4.3.3 Technical Description.

a. Content. The F-6 will contain a row of data for each day. The F-6 will also contain summary information of average and cumulative data. Missing data will be indicated with an "M," as appropriate. WFOs will **not** make estimates for missing data. To ensure consistency with NCDC routines, one or more missing daily values will result in an "M" for the corresponding monthly average or cumulative data value.

b. Format. WFO posting F-6s will use the standard format (on the next page), following the key).

Key to daily columns in the F-6: (midnight to midnight LST).

Column 1 - Day of month.
Column 2 - Maximum temperature for the day (nearest whole degree Fahrenheit).
Column 3 - Minimum temperature for the day (nearest whole degree Fahrenheit).
Column 4 - Average daily temperature (nearest whole degree Fahrenheit using columns 2 and 3).
Column 5 - Departure of the average temperature from normal (whole degrees Fahrenheit).
Column 6A - Heating Degree Days (HDD) using 65°F base, in whole degrees Fahrenheit.
Column 6B - Cooling Degree Days (CDD) using 65°F base, in whole degrees Fahrenheit.
Column 7 - Precipitation amount for the day (liquid equivalent, in hundredths of inches).
Column 8 - Snowfall amount (including ice pellets) for the day, in tenths of inches.
Column 9 - Snow depth (including ice pellets, glaze, and hail) to nearest whole inch (taken at 1200 Universal Coordinated Time). Hail is noted in remarks section.
Column 10 - Average daily wind speed in miles per hour.
Column 11 - Fastest two-minute sustained (or average) wind speed in miles per hour.
Column 12 - Direction of fastest wind speed; degrees clockwise from true north.
Column 13 - Minutes of sunshine
Column 14 - Percent of possible sunshine.
Column 15 - Cloud cover from sunrise to sunset in tenths.
Column 16 - Weather codes (from weather key on F-6 form).
Column 17 - Peak wind gust in miles per hour.
Column 18 - Direction of peak wind gust in degrees clockwise from true north.

```
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

                                          STATION:
                                          MONTH:
                                          YEAR:
                                          LATITUDE:
                                          LONGITUDE:

  TEMPERATURE IN F:       :PCPN:    SNOW:  WIND      :SUNSHINE: SKY     :PK WND
================================================================================
1   2   3   4   5  6A  6B    7    8   9   10  11  12  13   14  15   16   17  18
                                          AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD  WTR  SNW DPTH SPD SPD DIR MIN PSBL S-S WX    SPD DR
================================================================================
...for each day of month...  ...see column key on preceding page...
================================================================================
SM ...summations for columns 2, 3, 6A, 6B, 7, 8, 10, 13 and 15...
================================================================================
AV (for columns 2, 3)                        FASTST  PSBL  %        MAX(MPH)
                                MISC ----->  #                  (and direction)
================================================================================

NOTES:
# LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2
                                          STATION:
                                          MONTH:
                                          YEAR:
                                          LATITUDE:
                                          LONGITUDE:

[TEMPERATURE DATA]      [PRECIPITATION DATA]       SYMBOLS USED IN COLUMN 16

AVERAGE MONTHLY:        TOTAL FOR MONTH:           1 = FOG
DPTR FM NORMAL:         DPTR FM NORMAL:            2 = FOG REDUCING VISIBILITY
HIGHEST:       ON       GRTST 24HR       ON            TO 1/4 MILE OR LESS
LOWEST:        ON                                  3 = THUNDER
                        SNOW, ICE PELLETS, HAIL    4 = ICE PELLETS
                        TOTAL MONTH:               5 = HAIL
                        GRTST 24HR       ON        6 = GLAZE OR RIME
                        GRTST DEPTH:     ON        7 = BLOWING DUST OR SAND:
                                                       VSBY 1/2 MILE OR LESS
                                                   8 = SMOKE OR HAZE
[NO. OF DAYS WITH]      [WEATHER - DAYS WITH]      9 = BLOWING SNOW
                                                   X = TORNADO
MAX 32 OR BELOW:        0.01 INCH OR MORE:
MAX 90 OR ABOVE:        0.10 INCH OR MORE:
MIN 32 OR BELOW:        0.50 INCH OR MORE:
MIN  0 OR BELOW:        1.00 INCH OR MORE:

[HDD (BASE 65) ]
TOTAL THIS MO.          CLEAR  (SCALE 0-3)
DPTR FM NORMAL          PTCLDY (SCALE 4-7)
SEASONAL TOTAL          CLOUDY (SCALE 8-10)
DPTR FM NORMAL

[CDD (BASE 65) ]
TOTAL THIS MO.
DPTR FM NORMAL          [PRESSURE DATA]
SEASONAL TOTAL          HIGHEST SLP   ON
DPTR FM NORMAL          LOWEST  SLP   ON

[REMARKS]
```

4.3.4. Updates, Amendments, and Corrections . WFOs will perform a quality control check of the F-6 data before final posting for the month.

4.3.5 Supporting Software. The AWIPS CLIMATE program produces the F-6.

5. Surface National Climate Extremes. The following list contains elements for the official national climate extremes. There is a National Climate Extremes Committee (NCEC) to assess the scientific merit of potentially new national extreme climate record events. See appendix B for details on the NCEC.

Temperature (°F)
Maximum
Minimum
Maximum 24 hour change
Minimum annual

Snow (inches)
Maximum 24 hour
Maximum seasonal (July-June)
Maximum Depth

Rain (inches)
Maximum 24 hour
Maximum annual
Minimum annual

Longest Dry Period (days)

Hail (diameter/circumference - inches)
Largest
Heaviest

Pressure (millibars/inches of Hg)
Lowest
Highest

Wind (miles per hour)
Maximum gust

6. Base Period Means and Outlook Class Limits for Climate Outlooks. CPC provides this information for surface air temperature, precipitation, sea surface temperature, and 500 millibar heights as reference in their climate outlooks. The information applies to the valid times of the various outlooks. CPC and the Climate Services Division will announce the effective date of the new base period means and class limits at least 30 days in advance.

6.1 Definitions.

Base Period Mean. CPC computes base period means for each of the 102 climate outlook divisional areas and selected observing stations from a period comprising of three consecutive 10-year periods. CPC will use three consecutive 10-year periods ending in a decadal year (e.g. 1971-2000).

Outlook Class Limits. CPC provides the upper and lower parameter range of values for each of three climatologically equally likely classes: above, near, and below normal.

6.2 Temperature and Precipitation Base Period Means and Outlook Classes. CPC calculates this information for each of 102 areal climate outlook divisions and selected cities.

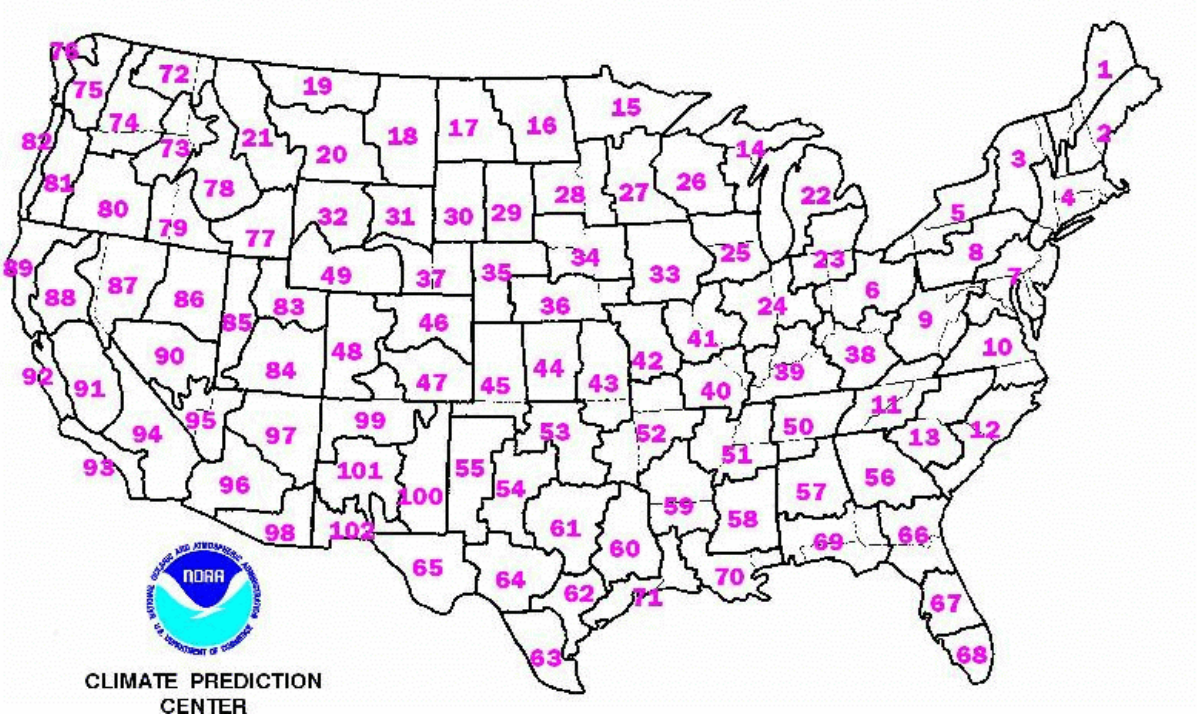

Figure 1. CPC Climate Outlook Divisions for contiguous U.S. (Note: Long Island NY is in division 4).

Base Period Means and Class Limits are calculated for the following valid times. This information is available in both graphic and text formats on CPC's web site. CPC may post just a subset of the valid time calculations for the 6- to 10-day and 8- to 14-day Outlooks (one or two valid times per month).

For Three-Month Outlooks:	For One-Month Outlooks
January through March	January
February through April	February
March through May	March
April through June	April
May through July	May
June through August	June
July through September	July
August through October	August
September through November	September
October through December	October
November through January	November
December through February	December

For 8- to 14-day Outlooks	For 6- to 10-Day Outlooks
January 1 through January 7	January 1 though January 5
January 2 through January 8	January 2 through January 6
etc.	etc.
December 31 through January 6	December 31 through January 4

The following are some example of CPC base period mean maps available on their web site.

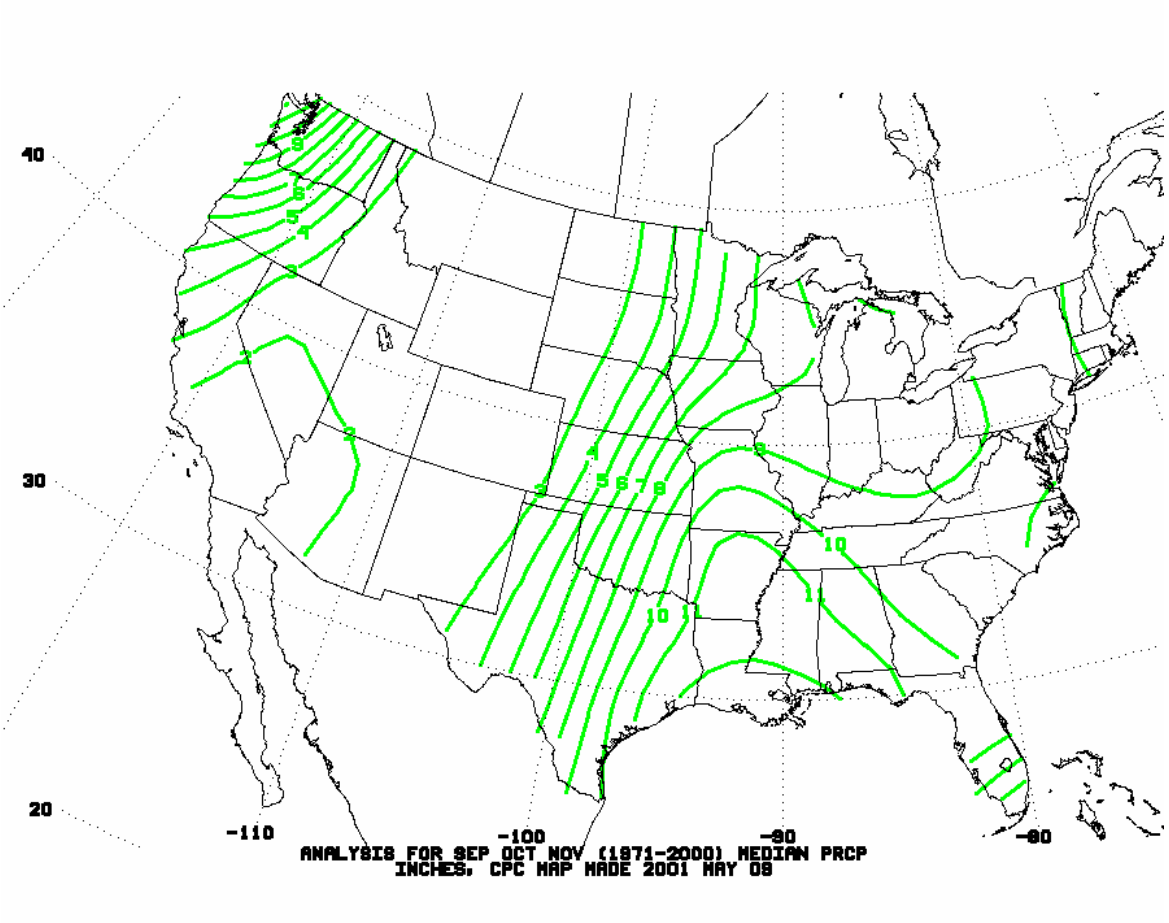

Figure 2. Map of CPC 1971-2000 base period mean total precipitation (inches) for September through November.

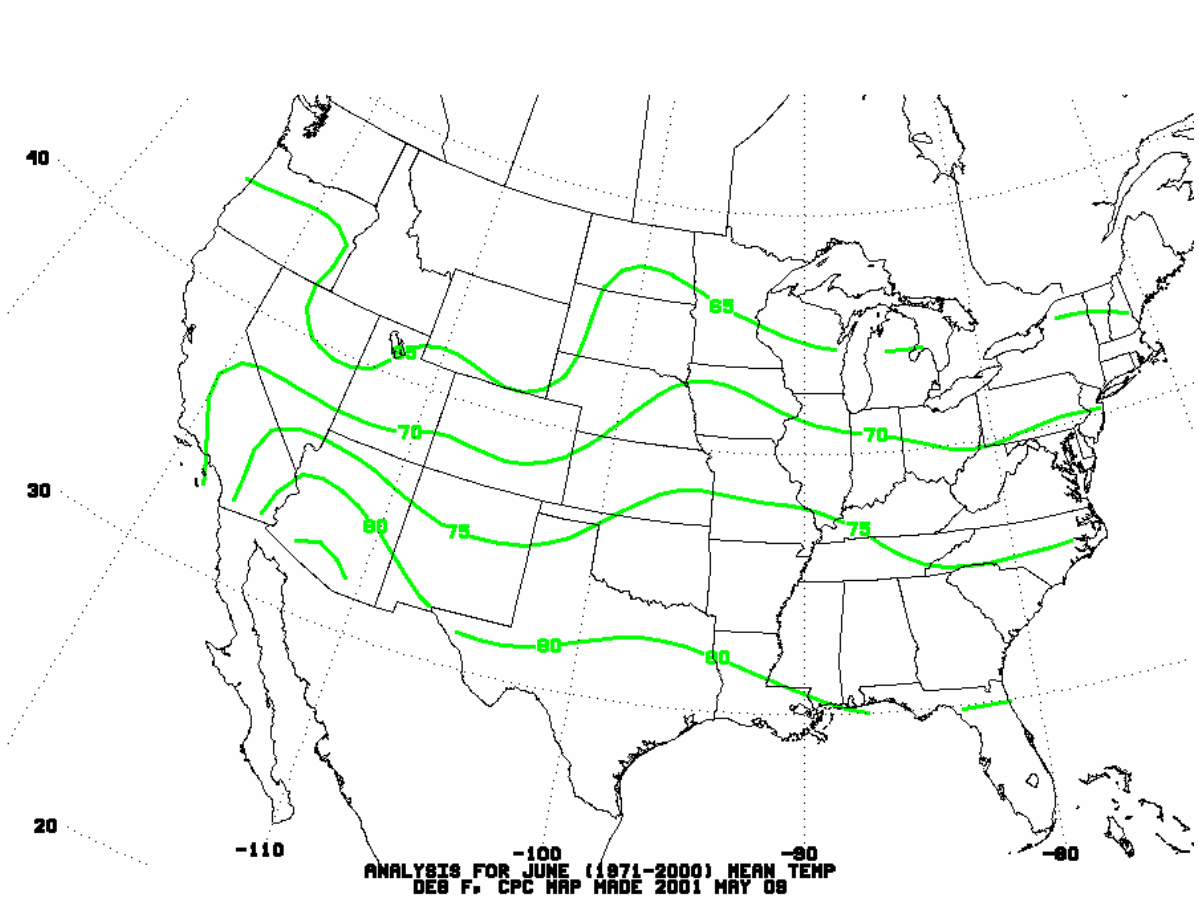

Figure 3. Map of CPC 1971-2000 base period mean temperature for June.

6.3 Base Period Means for Mean 500 millibar heights. CPC has calculated mean 500 millibar heights for the valid times listed in section 4.1. This information is available in graphic format on CPC's web site. The following is an example of base period mean 500 millibar chart.

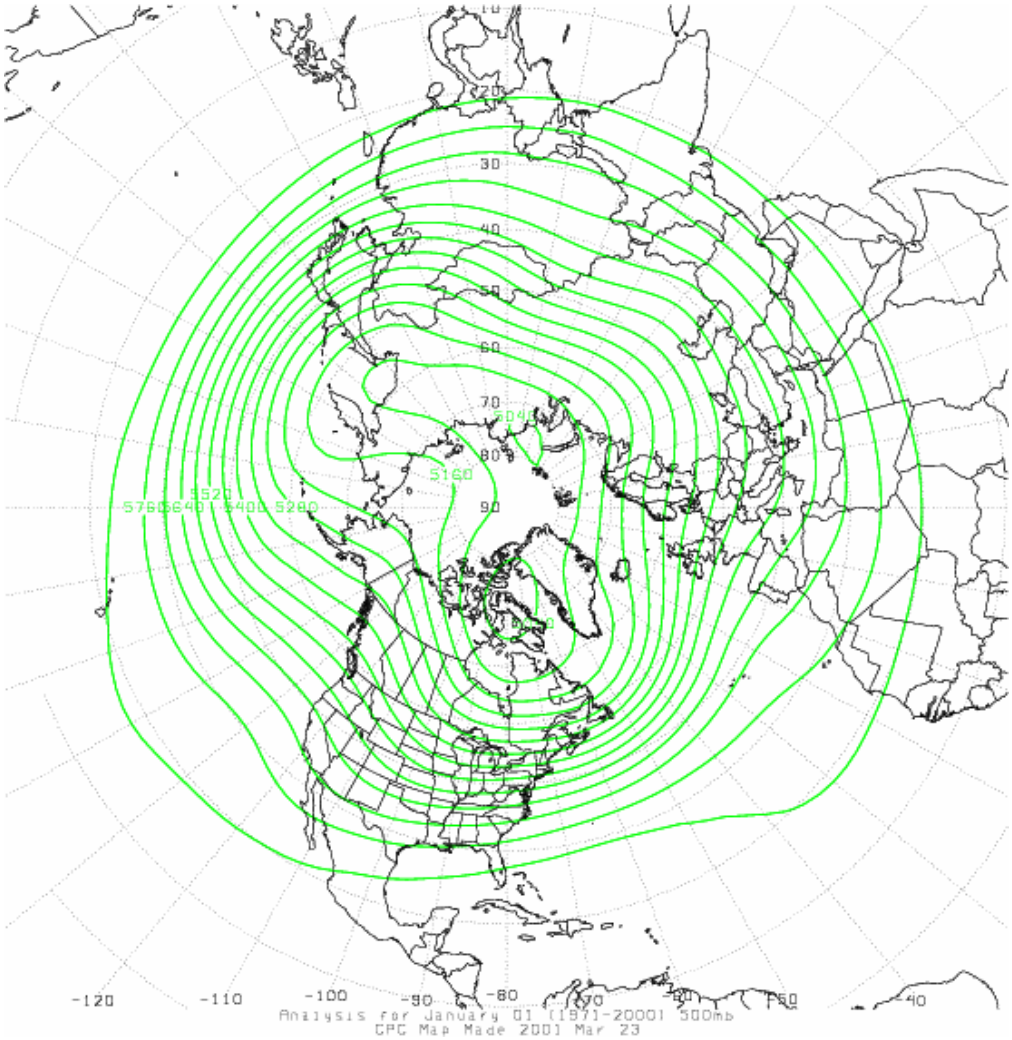

Figure 4. CPC 1971-2000 base period mean 500 millibar height chart (in decimeters) for January 1 through 5 (to be used to determine height anomalies in the 6- to 10-day 500 height outlook issued December 26).

6.4 Sea Surface Temperature (SST) Base Period Means. CPC has calculated SST means for each month as reference to the official Tropical Pacific SST Outlook (for the Pacific Niño 3.4 area [5°N to 5° S and 120° W to 170°W]). The CPC web site provides global maps of the base period SST means and charts for critical "Niño"subsections of Tropical Pacific Ocean. Since the SST outlooks are valid for three-month periods, CPC averages the base period SST means of the three months as a reference to calculate the predicted three-month anomaly.

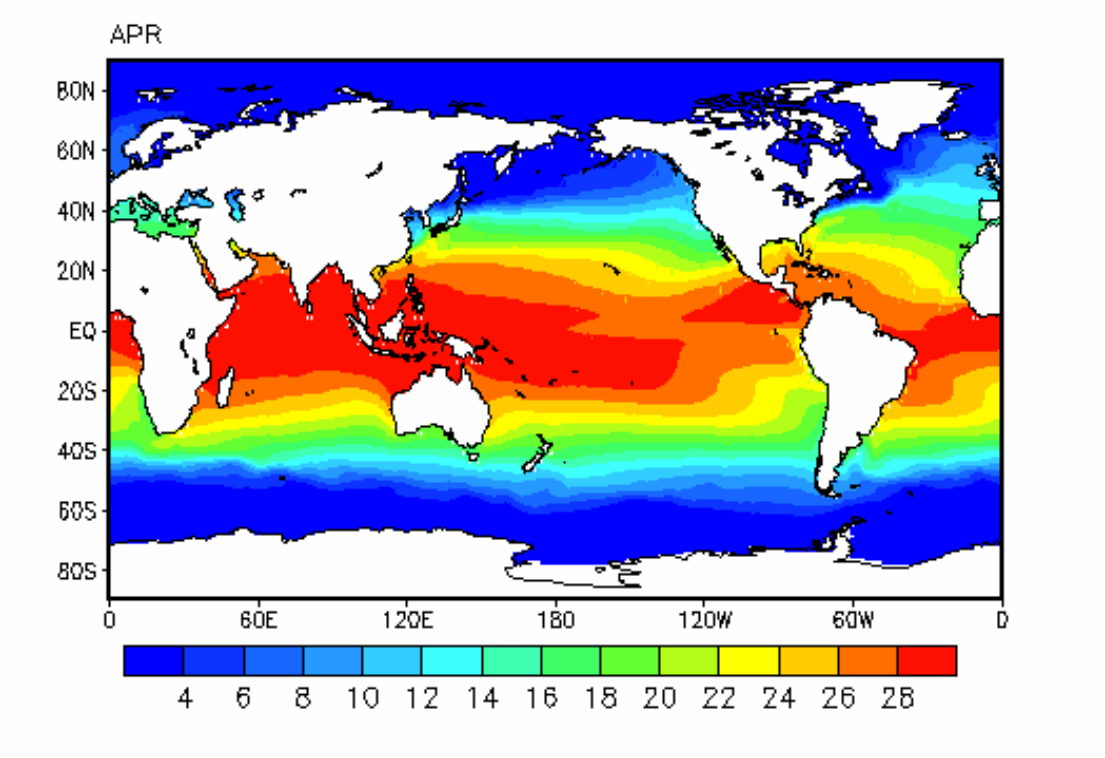

Figure 5. April 1971-2000 base period mean sea surface temperature chart. Temperatures are in Celsius.

Appendix A – Ten Climate Monitoring Principles

The National Research Council (NRC 1999) recommended that the following ten climate monitoring principles, proposed by Karl *et al.* (1995), should be applied to climate monitoring systems:

1. **Management of Network Change:** Assess how and the extent to which a proposed change could influence the existing and future climatology obtainable from the system, particularly with respect to climate variability and change. Changes in observing times will adversely affect time series. Without adequate transfer functions, spatial changes and spatially dependent changes will adversely affect the mapping of climatic elements.

2. **Parallel Testing:** Operate the old system simultaneously with the replacement system over a sufficiently long time period to observe the behavior of the two systems over the full range of variation of the climate variable observed. This testing should allow the derivation of a transfer function to convert between climatic data taken before and after the change. When the observing system is of sufficient scope and importance, the results of parallel testing should be documented in peer-reviewed literature.

3. **Meta Data:** Fully document each observing system and its operating procedures. This is particularly important immediately prior to and following any contemplated change. Relevant information includes: instruments, instrument sampling time, calibration, validation, station location, exposure, local environmental conditions, and other platform specifics that could influence the data history. The recording should be a mandatory part of the observing routine and should be archived with the original data. Algorithms used to process observations need proper documentation. Documentation of changes and improvements in the algorithms should be carried along with the data throughout the data archiving process.

4. **Data Quality and Continuity:** Assess data quality and homogeneity as a part of routine operating procedures. This assessment should focus on the requirements for measuring climate variability and change, including routine evaluation of the long-term, high-resolution data capable of revealing and documenting important extreme weather events.

5. **Integrated Environmental Assessment:** Anticipate the use of data in the development of environmental assessments, particularly those pertaining to climate variability and change, as a part of a climate observing system's strategic plan. National climate assessments and international assessments (e.g., international ozone or IPCC) are critical to evaluating and maintaining overall consistency of climate data sets. A system's participation in an integrated environmental monitoring program can also be quite beneficial for maintaining climate relevancy. Time series of data achieve value only with regular scientific analysis.

6. **Historical Significance:** Maintain operation of observing systems that have provided homogeneous data sets over a period of many decades to a century or more. A list of

protected sites within each major observing system should be developed, based on their prioritized contribution to documenting the long-term climate record.

7. **Complementary Data:** Give the highest priority in the design and implementation of new sites or instrumentation within an observing system to data-poor regions, poorly observed variables, regions sensitive to change, and key measurements with inadequate temporal resolution. Data sets archived in non-electronic format should be converted for efficient electronic access.

8. **Climate Requirements:** Give network designers, operators, and instrument engineers climate monitoring requirements at the outset of network design. Instruments must have adequate accuracy with biases sufficiently small to resolve climate variations and changes of primary interest. Modeling and theoretical studies must identify spatial and temporal resolution requirements.

9. **Continuity of Purpose:** Maintain a stable, long-term commitment to these observations, and develop a clear transition plan from serving research needs to serving operational purposes.

10. **Data and Meta Data Access:** Develop data management systems that facilitate access, use, and interpretation of data and data products by users. Freedom of access, low cost mechanisms that facilitate use (directories, catalogs, browse capabilities, availability of meta data on station histories, algorithm accessibility and documentation, etc.), and quality control should be an integral part of data management. International cooperation is critical for successful data management.

References:

Karl, T.R., V.E. Derr, D.R. Easterling, C.K. Folland, D.J. Hoffman, S. Levitus, N.Nicholls, D.E. Parker, and G.W. Withee, 1995: Critical issues for long-term climate monitoring. ***Climatic Change***, **31**, 185-221.

National Research Council (NRC), 1999: **Adequacy of Climate Observing Systems**, National Academy Press, Washington, D.C.

Appendix B - Request for National Climatic Extremes Committee (NCEC) Activation For Potential Events

When the possibility that a new national climate extreme has occurred, the NCEC will consider requests for activation to evaluate and decide the validity of the event through the following procedures:

i. NCEC chair (NCDC) will accept direct requests for activation only from the following official requesting contacts. Observers (or reporters of automated events) can report to any one of these contacts for forwarding to NCEC except all WFO observations or WFO received reports will be forwarded through one of their NWS Regional Headquarters (c).

a) State climatologists

b) Regional Climate Center directors

c) NWS Regional Headquarters (any one of the following; Regional Climate Services Program Managers, Regional Warning Coordination Meteorologist, or Regional COOP Program Manager).

d) NWS Climate Services Division (W/OS4)

e) NWS Observing Services Division (W/OS7)

f) NCDC Data Operations Division (E/CC1)

ii. Official requesters can make activation requests by email to the NCEC chairman with cc the other NCEC members or by a telephone call to the NCEC chair. If the chair is unavailable via telephone, other NCEC members may be called. Requests should include the following information:

a) Name and affiliation of requester and address, e-mail, telephone, etc.

b) Observer or reporter name and affiliation (COOP, FAA or NWS contractor, WFO, etc.) and address, e-mail, telephone, etc.

c) Station and instrument types; COOP, ASOS, snowboards, stakes, rulers, etc.

d) Type of event being requested for evaluation as per list of existing records

e) Time of event (date, month, year, and time of day)

f) Place of event (distance and direction from known landmark, city, etc.) (e.g. 30 miles west of Sioux Falls, 2 miles south of Mt. Rushmore)

iii. Official requesters should screen the observation or report to ensure that the event falls under the charter of the NCEC's authority (i.e., a national climate record is in question as per list of existing records).

iv. Requests for NCEC activation will receive a response from the chair or backup member as soon as possible. NCEC should expedite responses to requests with "perishable" evidence such as hail or snow.

Appendix C – Local Climatological Data Stations

ALASKA		
	ANC	ANCHORAGE INTL AP
	ANN	ANNETTE ISLAND AP
	BRW	BARROW W POST-W ROGE
	BET	BETHEL AIRPORT
	BTT	BETTLES FIELD
	BIG	BIG DELTA ALLEN AAF
	CDB	COLD BAY AP
	FAI	FAIRBANKS INTL AP
	GKN	GULKANA INTERMEDIATE
	HOM	HOMER AP
	JNU	JUNEAU AP
	AKN	KING SALMON AP
	ADQ	KODIAK STATE CG BASE
	OTZ	KOTZEBUE RALPH WEIN
	MCG	MCGRATH
	OME	NOME MUNICIPAL AP
	SNP	ST PAUL ISLAND AP
	TKA	TALKEETNA STATE AP
	UNK	UNALAKLEET FIELD
	VWS	VALDEZ WSO
	YAK	YAKUTAT STATE AP
ALABAMA		
	BHM	BIRMINGHAM MUNI AP
	HSV	HUNTSVILLE MADISON
	MOB	MOBILE REGIONAL AP
	MGM	MONTGOMERY DANNELLY
ARKANSAS		
	FSM	FT SMITH MUNICIPL AP
	LIT	LITTLE ROCK ADAMS FD
	1M1	NORTH LITTLE ROCK, AR
AMERICAN SAMOA		
	NSTU	TAFUNA AMERICAN SAMO
ARIZONA		
	FLG	FLAGSTAFF
	PHX	PHOENIX
	TUS	TUCSON INTL ARPT
	INW	WINSLOW
CALIFORNIA		
	BFL	BAKERSFIELD MEADOWS
	BIH	BISHOP AP
	EKA	EUREKA WSO CITY
	FAT	FRESNO AIR TERMINAL
	LGB	LONG BEACH DAUGHERTY
	5115	LOS ANGELES C.O., CA
	LAX	LOS ANGELES INTL AP
	RDD	REDDING MUNICIPAL AP
	SAC	SACRAMENTO EXEC ARPT
	SAN	SAN DIEGO LINDBERGH
	7772	SAN FRANCISCO C.O., CA
	SFO	SAN FRANCISCO INT AP
	SMX	SANTA MARIA PBLC AP
	SCK	STOCKTON METRO ARPT
COLORADO		
	AKO	AKRON WASHINGTON CO
	ALS	ALAMOSA BERGMAN FLD
	COS	COLORADO SPRGS MUNI
	DEN	DENVER INTL AP
	GJT	GRAND JUNCTION WLKR
	PUB	PUEBLO MEMORIAL AP
CONNECTICUT		
	BDR	BRIDGEPORT SIKORSKY
	BDL	HARTFORD BRADLEY AP
DELAWARE		
	ILG	WILMINGTN NEW CASTLE
FLORIDA		
	DAB	DAYTONA BEACH REG AP
	FMY	FORT MYERS
	GNV	GAINESVILLE MUNI AP
	JAX	JACKSONVILLE INTL AP
	EYW	KEY WEST INTL ARPT
	MIA	MIAMI INTL ARPT
	MCO	ORLANDO INTL ARPT
	PNS	PENSACOLA REGIONL AP
	TLH	TALLAHASSEE MUNI AP
	TPA	TAMPA INTL ARPT
	VRB	VERO BEACH MUNI AP
	PBI	W PALM BEACH INTL AP
GEORGIA		
	AHN	ATHENS MUNI AP
	ATL	ATLANTA HARTSFIELD
	AGS	AUGUSTA BUSH FIELD
	CSG	COLUMBUS METRO AP
	MCN	MACON LEWIS B WILSON
	SAV	SAVANNAH INTL AP
GUAM		
	PGUM	GUAM NAS
HAWAII		
	ITO	HILO GEN LYMAN FIELD
	HNL	HONOLULU INTL AP
	OGG	KAHULUI AP
	LIH	LIHUE AIRPORT
IOWA		
	DSM	DES MOINES AP
	DBQ	DUBUQUE REGIONAL AP
	SUX	SIOUX CITY MUNI AP
	ALO	WATERLOO MUNI AP

IDAHO		
	BOI	BOISE AIR TERMINAL
	LWS	LEWISTON NEZ PERCE
	PIH	POCATELLO MUNICIPAL
ILLINOIS		
	ORD	CHICAGO OHARE
	RFD	GREATER ROCKFORD AP
	MLI	MOLINE QUAD CITY AP
	PIA	PEORIA GTR PEORIA AP
	SPI	SPRINGFIELD CAPTL AP
INDIANA		
	EVV	EVANSVILLE REG AP
	FWA	FORT WAYNE BAER FLD
	IND	INDIANAPOLIS INTL AP
	SBN	SOUTH BEND ST JOSEPH
KANSAS		
	CNK	CONCORDIA BLOSSER AP
	DDC	DODGE CITY MUNI AP
	GLD	GOODLAND RENNER FLD
	TOP	TOPEKA MUNI ARPT
	ICT	WICHITA MID-CNTNT AP
KENTUCKY		
	JKL	JACKSON J CARROLL AP
	LEX	LEXINGTON BLUEGRASS
	SDF	LOUISVILLE STANDIFRD
	PAH	PADUCAH BARKLEY FLD
LOUISIANA		
	BTR	BATON ROUGE RYAN AP
	LCH	LAKE CHARLES NWSO
	MSY	NEW ORLEANS INTL AP
	SHV	SHREVEPORT REGIONAL
MASSACHUSETTS		
	0736	BLUE HILL, MA
	BOS	BOSTON LOGAN INTL AP
	ORH	WORCESTER MUNI AP
MARYLAND		
	BWI	BALT-WASHGTN INTL AP
MAINE		
	CAR	CARIBOU MUNI ARPT
	PWM	PORTLAND INTL JETPRT
MICHIGAN		
	APN	ALPENA PHELPS COL AP
	Y62	CHIPPEWA COUNTY INT'L
	DTW	DETROIT METRO AP
	FNT	FLINT BISHOP ARPT
	GRR	GRAND RAPIDS KENT AP
	HTL	HOUGHTON LAKE ROSCMN
	LAN	LANSING CAPITAL CITY
	MQT	MARQUETTE CTY AP FAA
	MKG	MUSKEGON CO ARPT
	ANJ	SAULT STE. MARIE
MINNESOTA		
	DLH	DULUTH INTL AP
	INL	INTERNATL FALLS ARPT
	MSP	MINNEAPOLIS NAS
	RST	ROCHESTER MUNI AP
	STC	ST CLOUD MUNI ARPT
MISSOURI		
	COU	COLUMBIA MUNI AP
	MCI	KANSAS CITY INTL AP
	SGF	SPRINGFIELD
	STL	ST LOUIS LAMBERT AP
MISSISSIPPI		
	JAN	JACKSON THOMPSON FLD
	MEI	MERIDIAN KEY FLD
	TUP	TUPELO C D LEMONS AP
MONTANA		
	BIL	BILLINGS LOGAN AP
	GGW	GLASGOW INTL AP
	GTF	GREAT FALLS INTL AP
	HLN	HELENA ARPT
	FCA	KALISPELL GLACIER AP
	MSO	MISSOULA JOHNSN-BELL
NORTH CAROLINA		
	AVL	ASHEVILLE REGIONL AP
	CLT	CHARLOTTE DOUGLAS AP
	GSO	GREENSBORO
	RDU	RALEIGH DURHAM AP
	HSE	HATTERAS MITCHELL FLD
	ILM	WILMINGTON NEW HANVR
NORTH DAKOTA		
	BIS	BISMARCK MUNI AP
	FAR	FARGO
	GFK	GRAND FORKS
	ISN	WILLISTON SLOULIN AP
NEBRASKA		
	GRI	GRAND ISLAND ARPT
	LNK	LINCOLN MUNI AP
	OFK	NORFOLK STEFAN AP
	LBF	NORTH PLATTE BRD FLD
	OMA	OMAHA EPPLEY AIRFLD
	BFF	SCOTTSBLUFF CNTY AP
	VTN	VALENTINE MILLER FLD
NEW HAMPSHIRE		
	CON	CONCORD MUNI AP
	MWN	MOUNT WASHINGTON
NEW JERSEY		
	0325	ATLANTIC CITY C.O., NJ
	ACY	ATLANTIC CITY INT AP
	EWR	NEWARK INTL ARPT

NEW MEXICO		
	CAO	CLAYTON MUNI ARPK
	ABQ	KIRTLAND AAF
	ROW	ROSWELL INDSTRL ARPK
NEVADA		
	EKO	ELKO MUNICIPAL AP
	ELY	ELY YELLAND FIELD
	LAS	LAS VEGAS MCCRN INTL
	RNO	RENO CANNON INTL AP
	WMC	WINNEMUCCA MUNI AP
NEW YORK		
	ALB	ALBANY COUNTY AP
	BGM	BINGHAMTON LINK FLD
	BUF	BUFFALO GR BUFFLO AP
	ISP	ISLIP L I MACARTHUR
	NYC	NEW YORK CITY R
	JFK	NEW YORK J F KENNEDY
	LGA	NEW YORK LAGUARDIA
	ROC	ROCHESTER INTL AP
	SYR	SYRACUSE HANCOCK AP
OHIO		
	CAK	AKRON-CANTON REG AP
	CVG	CINCI-NORTHERN KY AP
	CLE	CLEVELAND HOPKINS AP
	CMH	COLUMBUS INTL AP
	DAY	DAYTON INTL ARPT
	MFD	MANSFIELD LAHM AP
	TOL	TOLEDO EXPRESS AP
	YNG	YOUNGSTOWN MUNI AP
OKLAHOMA		
	OKC	OKLAHOMA CITY ROGERS
	TUL	TULSA INTL AP
OREGON		
	AST	ASTORIA CLATSOP ARPT
	BNO	BURNS MUNICIPAL AP
	EUG	EUGENE MAHLON SWEET
	MFR	MEDFORD JACKSON CO
	PDT	PENDLETON MUNICPL AP
	PDX	PORTLAND INTL ARPT
	SLE	SALEM MCNARY FIELD
PENNSYLVANIA		
	ABE	ALLENTOWN A-B-E INTL
	ERI	ERIE INTL ARPT
	MDT	MIDDLETOWN HARRISBRG
	PHL	PHILADELPHIA INTL AP
	PIT	PITTSBURGH GR P'BURG
	AVP	WILKES-BARRE SCRANTN
	IPT	WILLIAMSPRT-LYCOMING
PACIFIC ISLANDS		
	PTRO	KOROR W CAROLINE ISL
	PKWA	KWAJALEIN NF
	PKMJ	MAJURO MARSHALL ISLA
	PTPN	PONAPE CAROLINE ISLA
	PTKK	TRUK ISLAND CAROLINE
	PWAK	WAKE ISLAND
	PTYA	YAP ISLAND CAROLINE
PUERTO RICO		
	SJU	ISLA VERDE INTL AIRPOR
RHODE ISLAND		
	PVD	PROVIDENCE GREEN ST
SOUTH CAROLINA		
	1549	CHARLESTON C.O., SC
	CHS	CHARLESTON INTL ARPT
	CAE	COLUMBIA METRO AP
	GSP	GREER GREENV'L-SPART
SOUTH DAKOTA		
	ABR	ABERDEEN REGIONAL AP
	HON	HURON REGIONAL AP
	RAP	RAPID CITY REGINL AP
	FSD	SIOUX FALLS FOSS FLD
TENNESSEE		
	TRI	BRISTOL TRI CITY AP
	CHA	CHATTANOOGA LOVELL
	TYS	KNOXVILLE MCG TYSON
	MEM	MEMPHIS INTL ARPT
	BNA	NASHVILLE METRO AP
	OAKT	OAK RIDGE, TN
TEXAS		
	ABI	ABILENE MUNI AP
	AMA	AMARILLO INTL ARPT
	AUS	AUSTIN MUNICIPAL AP
	BRO	BROWNSVILLE INTL AP
	CRP	CORPUS CHRISTI INTL
	DFW	DALLAS-FT WORTH AP
	DRT	DEL RIO INTL APRT
	ELP	EL PASO INTL ARPT
	IAH	HOUSTON INT'CNTNL AP
	LBB	LUBBOCK REGIONAL AP
	MAF	MIDLAND REGIONAL TER
	BPT	PORT ARTHUR JEFFERSN
	SJT	SAN ANGELO MATHIS FD
	SAT	SAN ANTONIO INTL AP
	VCT	VICTORIA REGIONAL AP
	ACT	WACO MADISN COOPR AP
	SPS	WICHITA FALLS MUN AP
UTAH		
	SLC	SALT LK CITY INTL AP
VIRGINIA		
	LYH	LYNCHBURG MUNI AP
	ORF	NORFOLK INTL ARPT
	RIC	RICHMOND BYRD AP
	ROA	ROANOKE WOODRUM AP
	WAL	WALLOPS ISLAND UAU
	DCA	WASHINGTN DC NATL AP
	IAD	WASHINGTON DC DULLES
VERMONT		
	BTV	BURLINGTON INTL AP

WASHINGTON		
	OLM	OLYMPIA AP
	UIL	QUILLAYUTE AP
	7458	SEATTLE S.O., WA
	SEA	SEATTLE-TACOMA AP
	GEG	SPOKANE INTL ARPT
	YKM	YAKIMA AIR TERMINAL
WISCONSIN		
	GRB	GREEN BAY AUSTIN STR
	LSE	LA CROSSE MUNI AP
	MSN	MADISON DANE CNTY AP
	MKE	MILWAUKEE MTCHLL FLD
WEST VIRGINIA		
	BKW	BECKLEY RALEIGH AP
	CRW	CHARLESTON KNWA AP
	EKN	ELKINS RNDLPH CO AP
	HTS	HNTNGTN TRI-STATE
WYOMING		
	CPR	CASPER NATRONA CO AP
	CYS	CHEYENNE MUNI AP
	LND	LANDER HUNT FIELD
	SHR	SHERIDAN COUNTY AP